The Navy Biofuel Initiative Under the Defense Production Act

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June 22, 2012

Congressional Research Service
7-5700
www.crs.gov
R42568

CRS Report for Congress
Prepared for Members and Committees of Congress

Summary

The Secretaries of Energy, Agriculture, and the Navy have entered into a Memorandum of Understanding (MOU) to "assist the development and support of a sustainable commercial biofuels industry." The objective of the MOU is the construction or retrofitting of multiple domestic commercial or pre-commercial scale advanced drop-in biofuel plants and refineries. The MOU would support the Navy's goal of deploying a "Green Strike Group" by the end of 2012, and "Great Green Fleet" by 2016 fueled in part with a 50/50 blend of hydrotreated renewable jet fuel (biofuel). The Navy proposes to use authority under the Defense Production Act of 1950 (DPA) to develop a domestic industrial capacity to supply biofuel. In its FY2013 Congressional Budget Request, the Department of Energy (DOE) requested authority to transfer funds to the DPA Fund, offering the justification that it will support the MOU with the technical expertise to move pilot-scale demonstration projects to larger-scale production in support of the Navy's Green Fleet Goal. Agriculture, Energy, and the Navy expect to fund this initiative at $510 million in aggregate over three years.

In the past, Congress has found it in the interest of national defense preparedness for government to assure that a domestic industrial capacity exists to produce fuel. Congress set aside the (now depleted) Naval Oil Reserves and Oil Shale Reserves to provide for the Navy's fuel requirements. Congress later promoted alternative fuel from coal through the U.S. Synthetic Liquid Fuels Act of 1944 to aid the execution of World War II, and to conserve and increase national oil resources. The act authorized the Secretary of the Interior to construct, maintain, and operate plants producing synthetic liquid fuel from coal, oil shale, and agricultural and forestry products. During the Korean War, the DPA authorized the President to have liquid fuels processed and refined for government use or resale, and to make improvements to government- or privately-owned facilities engaged in processing and refining liquid fuels when it would aid the national defense. In 1980, Congress amended the DPA to authorize the President's purchase of synthetic fuels for national defense. Most recently, the Energy Policy Act of 2005 directed the Secretary of Energy, in cooperation with the Secretaries of the Interior and Defense, to develop a program to accelerate the commercial development of strategic unconventional fuels, including but not limited to oil shale and tar sands resources within the United States. Except for exploiting the Naval Oil Reserve, policies that directed alternative fuel development for national defense interests have had to challenge newly discovered petroleum resources that presented clear economic advantages over alternative fuels.

Domestic crude oil production in the United States has increased over the past few years, reversing a decline that began in 1986. The United States is now a net exporter of refined petroleum products. Over the next 10 years, continued development of unconventional oil resources, in combination with the ongoing development of offshore resources in the Gulf of Mexico may push domestic crude oil production to a level not seen since 1994, according to the U.S. Energy Information Administration.

An important policy question for Congress may be whether a domestic biofuel industry is necessary for national defense, and whether proceeding under the authority of the DPA offers the necessary stimulus. A domestic biofuel industry may satisfy concerns for a secure, domestic, alternative fuel source independent of unstable foreign petroleum suppliers. However, adding biofuel to the military's supply chain does not relieve logistical issues with delivering fuel to forward operating areas, where fuel supply issues have been more about vulnerability than availability.

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Introduction

During the spring of 2011, the Secretaries of Energy, Agriculture, and the Navy entered into a Memorandum of Understanding (MOU) to "assist the development and support of a sustainable commercial biofuels industry."[1] The objective is the "construction or retrofit of multiple domestic commercial or pre-commercial scale advanced drop-in biofuel plants and refineries." The refineries would have the capability to produce advanced biofuels as "drop-in" replacements for petroleum-based fuels. Drop-in fuels[2] would be able to substitute for standard petroleum products without alteration to ship or aircraft engines, meet military specifications at a price competitive with petroleum, be readily accessible at geographically diverse locations, and have no significant impact on the supply of agricultural commodities for the production of food. Through this and other undertakings, the Navy intends to demonstrate that it can reduce its dependence on petroleum-based fuels. In accordance with the MOU, the Navy proposes to use some of the authorities of the Defense Production Act (DPA) of 1950 (50 U.S.C. Appx §2061 et seq.), as amended, to develop a domestic industrial capacity and supply of biofuel.

The Navy plans a feasibility demonstration of drop-in biofuels with a "Green Strike Group" fleet exercise by the end of 2012 composed of nuclear vessels and ships powered in part by biofuel, followed by a 2016 "Great Green Fleet" exercise composed of nuclear ships, and surface combatants and aircraft powered in part by biofuel.

The DPA grants various authorities to the President—subsequently delegated to certain Cabinet Secretaries[3]—that they may use to support the domestic production of alternative energy sources. Congressional actions on the budget requests for MOU funding would help define the parameters by which agencies acting under the DPA may support the domestic development of alternative energy sources as well as how the Navy's support of such sources will evolve.

The current debate in Congress regarding DPA is whether its authority should extend to developing an industrial capacity for biofuel.

To better the understanding of the potential benefits and drawbacks to the Navy the following discussion provides a background on the Navy's fleet, fuel requirements, and fuel spending. The Navy, and later DOD, have undertaken a number of past initiatives for securing its fuel supply, some under the authority of DPA. The Navy successfully transitioned from exclusive reliance on petroleum in 1955 when it commissioned the USS *Nautilus*, the world's first nuclear-powered submarine. In past hearings on renewing the DPA, interest in the viability of nuclear-powered Navy and a nuclear power industry were part of the debate.[4]

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[1] *Memorandum of Understanding Between the Department of the Navy and the Department of Energy and the Department of Agriculture*, March 30, 2011, http://www.rurdev.usda.gov/SupportDocuments/DPASignedMOUEnergyNavyUSDA.pdf. For more information on bio-based diesel, see CRS Report R41631, *The Market for Biomass-Based Diesel Fuel in the Renewable Fuel Standard (RFS)*, by Brent D. Yacobucci, *The Market for Biomass-Based Diesel Fuel in the Renewable Fuel Standard (RFS)*, by Brent D. Yacobucci. For more information on algae-based biofuel, a commonly mentioned source of potential bio-jet fuel, see CRS Report R42122, *Algae's Potential as a Transportation Biofuel*, by Kelsi Bracmort.

[2] Drop-in fuels are a type of advanced biofuels that may be blended with conventional fuel and used in existing vehicles, and existing transportation and distribution infrastructure.

[3] See Exec. Order No. 13603, 77 Fed. Reg. 16651 (March 22, 2012).

[4] U.S. Congress, House Banking and Currency, *To Renew the Defense Production Act of 1950, As Amended*, 15683, (continued...)

Background on Naval Fuel Supply and Procurement

The Navy currently lists 395 ships in its inventory—36 nuclear powered warships, 50 conventional warships, and the remaining consisting of various auxiliary and civilian operated Military Sealift Command (MSC) ships (of which 14 are oil tankers—"oilers"). Conventional ships consume diesel fuel marine (DFM or NATO equivalent F-76, also referred to as ship's bunker fuel) which has been used in all shipboard propulsion plants (diesel, gas turbine, and steam boiler) since 1975. Naval aircraft consume primarily JP-5 jet fuel (MIL-DTL-5624 U or NATO code F-44) developed for use in military aircraft stationed aboard aircraft carriers where the risk of fire is a great concern, particularly in the confined spaces of the hanger deck. The fuel is kerosene-based, and has a relatively higher flash point (140 ºF) than other aviation turbine fuels (commercial Jet A and or military JP-8). JP-5 is also suitable for use as ship turbine fuel.

To date, the Navy has certified the F-18 Super Hornet, the F-18 legacy Hornet, the MV-22 Osprey, and the MH-60S Seahawk to operate on HRJ-5, a 50/50 blend of hydrotreated renewable fuel (HRJ) and conventional JP-5.[5] Hydrotreated refers to the process of cracking vegetable or animal oil through the addition of hydrogen into kerosene-range jet fuel. The process is similar to refining processes for upgrading petroleum.

Department of Defense (DOD) fuel consumption varies from year to year in response to changes in mission and the tempo of operations. In FY2011, DOD consumed 124.3 million barrels of refined petroleum products domestically, and another 96.6 million barrels overseas.[6] In contrast, the United States consumed slightly more than 6 billion barrels of refined petroleum products during calendar year 2011,[7] of which DOD domestic consumption represented roughly 2%. DOD overseas spending on ships' bunker fuel exceeded domestic spending—$2.7 billion for 7.5 million barrels from 73 ports in 50 countries, versus $239 million for 2.4 million barrels from 67 domestic ports.[8]

The Defense Logistics Agency–Energy (DLA-E) purchases fuel for all of DOD's services and agencies, both in the continental United States (CONUS) and outside (OCONUS). In practice, DLA-E typically awards fuel contracts based on the lowest cost to the point of delivery, typically for lengths of one year in a one-step process under the Defense Working Capital Fund (DWCF). It internally transfers (sells) the fuel to its DOD customers with a small markup to cover its operational costs. DOD customers in turn pay DLA-E through their annual appropriations for Operation and Maintenance (O&M). The DWCF permits DLA-E to take advantage of price breaks for large quantity purchases, and in most years provide DOD customers a stabilized price

(...continued)

90th Cong., p. 62.

[5] Chris Tindal (Director for Operational Energy) *Department of Navy Biofuel Initiatives*, October 5, 2011, South Dakota State University Industry Forum, http://ncsungrant.sdstate.org/upload/SDSU_Industry_Forum_CTindal_5Oct2011_v3.pdf.

[6] Defense Logistics Agency-Energy, *FY2011 Fact Book*: "Bulk Product Transport within the Continental United States" (p. 49), "Domestic Into-plane Contracts (p. 36), Domestic Ships' Bunkers Contracts" (p. 37), "Domestic Posts, Camps and Stations Contracts" (p.38), http://www.energy.dla.mil.

[7] U.S. Energy Information Administration, *Petroleum & Other Liquids*, Product Supplied, Area: U.S, Period-Unit: Annual-Thousand Barrels, 2011, http://www.eia.gov/dnav/pet/pet_cons_psup_dc_nus_mbbl_a.htm.

[8] The DLA-E Ship's Bunkers program provides commercial ship propulsion fuels for military and other U.S. government ships at commercial and military ports worldwide. DLA-E *FY2011 Fact Book*, p. 37.

for all products during that fiscal year. DOD has the capability to meet contingency fuel needs through the petroleum war-reserve stock that DLA-E maintains at its Defense Fuel Supply Points throughout the United States, as well as abroad.[9] DOD relies on both NATO partners and alliances with regional partners to supply fuel for overseas operations.

DLA-E authority to procure fuel extends from authority originally granted to the Navy. Under 10 U.S.C. §7229 (Purchase of Fuel), "... the Secretary of the Navy may, in any manner he considers proper, buy the kind of fuel that is best adapted to the purpose for which it is to be used." Section 7229 superseded 34 U.S.C. §580 which had been interpreted as authorizing the Armed Services Petroleum Purchasing Agency to negotiate contracts for the purchase of fuel, not only when acting as a procuring activity for the Navy, but also when filling the consolidated fuel requirements of the armed forces. However, DLA-E now relies on the general procurement authority under 10 U.S.C. §2304 (Contract: competition requirement), since this gives DOD the authority to buy almost any kind of supply or service.

DOD projects that its budget authority and outlay for fuel will decline 3% from the FY2013 base year and remain essentially level through FY2017.[10] For the period FY2008 through FY2010, the Navy consumed about 10.9 million barrels of JP-5 annually.[11] However, over the same FY2008-FY2010 period, Navy fuel spending declined from $4.75 billion to $3.73 billion.[12] In FY2011, DLA-E spent $1.57 billion to purchase 12.6 million barrels of (Navy) JP-5 jet fuel.[13] In 2011, the U.S. government purchases of F-76 military-grade diesel ranged from $2.19 to $2.75 per gallon, and JP-5 jet propellant ranged from $1.55 to $2.87 per gallon.[14] In 2009, DLA awarded small contracts for hydrotreated renewable fuel (HRJ-5 jet fuel) that ranged in price from $66 to $149 per gallon.[15] In late 2011, the Navy was able to purchase biofuel for roughly $26 per gallon in a bulk procurement of 450,000 gallons.

[9] See CRS Report R40459, *Department of Defense Fuel Spending, Supply, Acquisition, and Policy*, by Anthony Andrews.

[10] *National Defense Budget Estimates for FY2013*, Office of the Undersecretary of Defense (Comptroller), Table 5-5 "Department of Defense Deflators–TOA", pp. 59-60, March 2012, http://comptroller.defense.gov/defbudget/fy2013/FY13_Green_Book.pdf.

National Defense Budget Estimates for Fuel (FY2013 Base Year)

	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Fuel Purchase Inflation Rate Assumptions – Outlays	24.2	15.3	-3.1	-12.9	-0.3	0.3	0.6
Fuel Purchase Inflation Rate Assumptions – Budget Authority	24.2	15.3	-3.1	-12.9	-0.3	0.3	0.6
Fuel Deflator - Total Obligational Authority	89.5	103.2	100.0	87.1	86.8	87.1	87.6
Fuel Deflator – Budget Authority	89.5	103.2	100.0	87.1	86.8	87.1	87.6
Fuel Deflator – Outlays	89.5	103.2	100.0	87.1	86.8	87.1	87.6

Source: Green Book Tables 5-2 though 5-9.

[11] Defense Logistics Agency—Energy, *Fact Book Fiscal Year 2010*, p. 24, http://www.desc.dla.mil/DCM/DCMPage.asp?PageID=721.

[12] *Fact Book FY2010*, p. 22.

[13] Defense Logistics Agency—Energy, *FY2011 Fact Book*, pp. 28-29, http://www.energy.dla.mil.

[14] DLA-E Bulk Fuels Summary of Awards, *Solicitation SP0600-11-R-708, and SP0600-R-0061*, http://www.desc.dla.mil/DCM/DCMPage.asp?pageid=241.

[15] DLA-E Bulk Fuels Summary of Awards, *Solicitation SP0600-09-070,* http://www.desc.dla.mil/DCM/DCMPage.asp?pageid=241.

Previous Defense-Related Fuel Programs

Congress has previously found it in the interest of national defense preparedness for the federal government to assure some level of industrial capacity to produce both conventional and synthetic fuels. In the early 20th century, Congress set aside the (now depleted) Naval Oil Reserves and Oil Shale Reserves. World War II and Korean War concerns over fuel shortages led to congressionally authorized programs for developing synthetic fuels that lead up to authorizing a Synthetic Fuels Corporation during the 1970s Arab oil embargoes. In more recent legislation, Congress has directed DOD to develop a program to accelerate the commercial development of strategic unconventional fuels (from coal, oil shale or tars sands), examine the military utility of alternative and synthetic fuels, and study how to reduce their life-cycle emissions.

Naval Petroleum and Oil Reserves Set Aside

In the Pickett Act of 1910, Congress initially withdrew potential oil-bearing public lands in California and Wyoming as petroleum sources for the use of the Navy. Executive orders later created three Naval Petroleum and Oil Shale Reserves between 1912 and 1927 by setting aside federal lands believed to contain oil as an emergency reserve. In a 1920 naval appropriation bill, Congress gave the Secretary of the Navy the power "to conserve, develop, use and operate the same in his discretion, directly or by contract, lease, or otherwise, and to use, store, exchange, or sell the oil and gas products thereof, and those from all royalty oil from lands in the naval reserves, for the benefit of the United States."

Petroleum Reserve No. 3 in central Wyoming, the site of the infamous Teapot Dome, embroiled the Navy and Interior Department Secretaries in a 1920s scandal over a noncompetitive lease agreement made with an influential oil company executive. The Teapot Dome scandal ended with the indictment of federal officials involved and, more significantly, transformed federal leasing into a process based on open competitive bids. As the national defense needs changed, Congress opened the oil reserves to private production and eventually sold them. Management of the Naval Petroleum Reserves transferred to the Department of Energy (DOE) and of the Naval Oil Shale Reserves to the Department of the Interior (10 U.S.C. §§7420-7439).

Synthetic Liquid Fuels Development

Congress began promoting alternative fuel from coal through the U.S. Synthetic Liquid Fuels Act of 1944. The act intended to aid the execution of World War II and conserve and increase national oil resources by authorizing the Secretary of the Interior to construct, maintain, and operate plants producing synthetic liquid fuel from coal, oil shale, and agricultural and forestry products.[16] The Bureau of Mines received funding for an 11-year demonstration plant program that ended in 1955. During the Korean War, Section 303 of the Defense Production Act of 1950 (Chap. 932, 64 Stat. 978) authorized the President to have liquid fuels processed and refined for government use

[16] 30 U.S.C. Sections 321 to 325 authorized $30 million over five years for the construction and operation of demonstration plants to produce synthetic liquid fuels from coal, oil shales, agricultural and forestry products, and other substances.

or resale, and to make improvements to government- or privately-owned facilities engaged in processing and refining liquid fuels when it would aid the national defense.[17]

During the 1970s, DOE directed a synthetic fuels program toward commercializing coal liquefaction, coal gasification, and oil shale technologies. In 1980, Congress amended Section 305 of the Defense Production Act (P.L. 96-294, Energy Security Act) to authorize the President's purchase of synthetic fuels for national defense. President Carter then directed the Secretary of Defense to determine the quantity and quality of synthetic fuel needed to meet national defense needs.[18] Congress further amended the Defense Production Act to offer financial assistance in producing synthetic fuel from coal, oil shale, tar sands, and heavy oils by establishing the U.S. Synthetic Fuels Corporation (P.L. 96-294, the United States Synthetic Fuels Corporation Act of 1980).[19] The stated goal of the act was reaching a daily synthetic fuels production capacity of 500,000 barrels of oil-equivalent by 1987 and 2 million barrels by 1992.

DOD had become interested in oil shale as an alternative resource for producing quality jet fuel as early as 1951. The Navy and the Naval Petroleum and Oil Shale Reserves Office (NPSRO) started large-scale evaluations of oil shale's suitability for military fuels in the early 1970s, and conducted extensive tests of oil-shale distillates processed into gasoline, JP-4 (a highly volatile military jet fuel reserved for cold weather operations), JP-5 jet fuel, DFM/F-76, and a heavy fuel oil used in military and commercial equipment.[20]

In the late 1970s, the Air Force became interested in evaluating oil shale's suitability for producing JP-4 jet fuel and awarded contracts to develop technology for producing oil shale-derived JP-4 jet fuel.[21] Air Force research may have demonstrated oil shale's unsuitability for making JP-4. At best, oil shale produces mostly middle-range petroleum distillates suitable for

[17] Ch. 932, 64 Stat. 798 (Title III Expansion of Production Capacity and Supply) intended to develop and maintain whatever military and economic strength necessary to support collective action through the United Nations. The act authorized the diversion of certain materials and facilities from civilian to military use when expansion of production facilities beyond the levels needed to meet civilian demand was required.

[18] The American Presidency Project, Executive Order 12242 Synthetic Fuels, http://www.presidency.ucsb.edu/ws/index.php?pid=45171, signed September 30, 1980, was later revoked by President Reagan's Executive Order 12346, February 8, 1982. Available through the National Archives at http://www.archives.gov/federal-register/executive-orders/disposition.html.

[19] Title I, Part B of the Energy Security Act of 1980.

[20] Tosco (an acronym for "The Oil Shale Company") was contracted to produce and process 10,000 barrels of oil-shale distillates. Development Engineering, Inc., leased the federal Anvil Points site (Naval Oil Shale Reserve 3) in 1972 and formed the Paraho Development Corporation in 1973 (a consortium of 17 energy companies). Paraho's plans included a five-year program to develop two pilot scale retorts and produce oil-shale distillates for the Navy fuel testing. Paraho initially produced 10,000 barrels of oil-shale distillates that Sohio processed into gasoline, JP-4 and JP-5 jet fuel, DFM/F-76, and a heavy fuel oil at the Gary Western Refinery in Fruita, CO. Though the fuels produced were off-specification, analysis indicated that the refining process could be optimized to produce specification fuels. Paraho was awarded a follow-on contract to produce 100,000 barrels of oil-shale distillates for processing specification fuels in Sohio's Toledo Refinery.

[21] Under Project Rivet Shale, in 1979, the Air Force awarded contracts to Ashland Research and Development, Suntech, Inc., and UOP, Inc., to develop technology to produce oil shale-derived JP-4 jet fuel. In 1982, over 10,000 gallons of JP-4 were processed at the Caribou Four Corners Refinery in Woods Cross, UT, from crude oil-shale distillates produced by Geokinetics. JP-4 specification fuel was produced from other oil shale retorting techniques pioneered by Occidental, Paraho, and Union Oil. Unocal (formerly Union Oil Company) operated the Parachute Creek oil shale plant and reportedly produced 4.6 million barrels of oil-shale distillates from 1985 to 1990 for Air Force evaluation under Project Rivet Shale.

upgrading to kerosene and diesel fuel, while JP-4 is closer to lighter, gasoline-naphtha. The Air Force generally phased out JP-4 in the early 1990s in favor of kerosene-based JP-8.[22]

By the mid-1980s, the House began considering a bill to abolish the Synthetic Fuels Corporation with the Synthetic Fuels Fiscal Responsibility Act of 1985 (H.R. 935). In the debate of the bill (H.Rept. 99-196), the Energy and Commerce Committee linked abolishing the Corporation to reducing the federal deficit and viewed purchasing oil for the Strategic Petroleum Reserve as a far more cost effective defense against another oil embargo than subsidizing synthetic fuels. Congressional criticism also focused on conflicts of interest among the Corporation board members, high salaries for staff, lack of interest on the part of private industry, and the possibility of huge subsidies going to profitable oil companies. The minority view noted that as late as 1983, the DOD had certified that it needed synthetic fuel to meet national defense needs. Language rescinding most of the Synthetic Fuels Corporation funding was included in the FY1986 continuing appropriations resolution (H.J.Res. 465, P.L. 99-190).

Strategic Unconventional Fuels Commercial Development

The Energy Policy Act of 2005 (P.L. 109-58, Section 369, Oil Shale, Tar Sand and Other Strategic Unconventional Fuels) directed the Secretary of Energy, in cooperation with the Secretaries of the Interior and Defense, to jointly develop a program to accelerate the commercial development of strategic unconventional fuels, including but not limited to oil shale and tar sands resources within the United States. The act amended Chapter 141 of Title 10, United States Code, by inserting Section 2398a (Procurement of Fuel Derived from Coal, Oil Shale) directing the Secretary of Defense to develop a strategy to use fuel produced, in whole or in part, from coal, oil shale, and tar sands in meeting the fuel requirements of the DOD when the Secretary determines that it is in the national interest. While DOD did not pursue oil shale, it did pursue development of coal-to-liquids technology.[23] This pursuit ended when Congress enacted the Energy Independence and Security Act of 2007 (P.L. 110-140), in which Section 526 (Procurement and Acquisition of Alternative Fuels) effectively proscribed any federal effort to purchase alternative or synthetic fuels with lifecycle greenhouse emissions that exceeded emissions of fuels derived from conventional petroleum; a proscription likely to exclude coal-derived and other unconventional resource-derived fuels from facilities that do not capture and sequester carbon emissions. The provision did permit DOD to procure limited quantities of coal and gas-to-liquids fuels for certification testing.

Alternative Fuels Development

The Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 (P.L. 110-417, Section 334, Study on Alternative and Synthetic Fuels) required the Secretary of Defense to conduct a study on alternative fuels to reduce the life cycle emissions of alternative and synthetic fuels (including coal-to-liquids fuels), and in particular, examine the military utility of domestically produced alternative and synthetic fuels for military operations and for use by expeditionary forces. In response, the Secretary directed the RAND Corporation to study and

[22] For further information on oil shale, refer to CRS Report RL33359, *Oil Shale: History, Incentives, and Policy*, by Anthony Andrews.

[23] CRS Report RL34133, *Fischer-Tropsch Fuels from Coal, Natural Gas, and Biomass: Background and Policy*, by Anthony Andrews and Jeffrey Logan.

submit a report to Congress.[24] Generally, RAND found "that a domestic alternative fuel industry could yield large economic profits within the United States. By reducing demand for conventional petroleum, alternative fuel production would also lower world oil prices, countering efforts of certain foreign oil suppliers to control prices by restraining their production."[25] However, RAND further concluded, "There is no direct benefit to the Department of Defense or the services from using alternative fuels rather than petroleum-derived fuels." With regard to hydrotreated renewable oils, RAND found "insufficient evidence that appreciable quantities of hydrotreated renewable oils can be affordably produced in the United States in a manner that does not increase lifecycle greenhouse gas emissions. Oil production from crops, even if they are not food crops, raises important land-use issues. Oil production from meat and poultry processing is inherently limited by the amount of available wastes." RAND considered the prospects for affordably producing fuel from algae in a climate-friendly manner to remain extremely uncertain.

The Defense Production Act and Energy

The Defense Production Act of 1950 (DPA), as amended,[26] provides the President an "array of authorities to shape *national defense* preparedness programs and to take appropriate steps to maintain and enhance the domestic industrial base" [italics added].[27] As defined, "national defense" establishes the scope of all DPA authorities, and the use of any authority under the DPA must inherently be interpreted to "promote, support, or otherwise be deemed needed or essential for the national defense."[28] "National defense" as defined by statute means:

> programs for military and energy production or construction, military or critical infrastructure assistance to any foreign nation, homeland security, stockpiling, space, and any directly related activity. Such term includes emergency preparedness activities conducted pursuant to title VI of The Robert T. Stafford Disaster Relief and Emergency Assistance Act [42 U.S.C. §5195 et seq.] and critical infrastructure protection and restoration.[29]

Therefore, the purpose of the DPA authorities extends beyond shaping the U.S. military preparedness and capabilities, as the authorities may be used to enhance and support domestic preparedness, response, and recovery from natural hazards, terrorist attacks, and other national

[24] James T. Bartis and Lawrence Van Bibber, *Alternative Fuels for Military Applications*, RAND National Defense Research Institute, ISBN 978-0-8330-5000-7, 2011.

[25] RAND, P. 81.

[26] 50 U.S.C. Appx §2061 et seq.

[27] 50 U.S.C. Appx. §2062(a)(4); Section 2(a)(4) of the DPA (emphasis added).

[28] There are various iterations of this tie to national defense throughout the DPA. Some examples: Title I, Section 101 priorities and allocations authority requires the President to deem action as "necessary or appropriate to promote the national defense" (50 U.S.C. Appx. §2071(a)); Title III authorities can be used when "essential for the national defense" (50 U.S.C. Appx. §§2091(a), 2092(a), 2093(a)); and Title VII Voluntary Agreement authority requires that the use helps "provide for the national defense" (50 U.S.C. Appx. §2158(c)(1)).

[29] 50 U.S.C. Appx. §2152(14); Section 702(14) of the DPA. Further reference can be made to Title VI of the Stafford Act, at 42 U.S.C. §5195(a)(3) for a definition of "emergency preparedness" activities. It states that emergency preparedness "... means all those activities and measures designed or undertaken to prepare for or minimize the effects of a hazard upon the civilian population, to deal with the immediate emergency conditions which would be created by the hazard, and to effectuate emergency repairs to, or the emergency restoration of, vital utilities and facilities destroyed or damaged by the hazard."

emergencies, among other issues. The full purpose of the DPA is discussed in the "Declaration of Policy" issued as part of the statute.[30]

The DPA has been amended and reauthorized numerous times since its original enactment because the statute includes a sunset provision that has required periodic reauthorization and offered the opportunity for amendment. Congress passed the DPA in 1950 and has thus far reauthorized it 17 times, in 1951, 1952, 1953, 1955, 1974, 1975, 1977, 1980, 1984, 1986, 1991, 1992, 1995, 2001, 2003, 2008, and 2009.[31] The authorities provided in the DPA, with few exceptions, are set to expire on September 30, 2014.[32]

How the DPA Applies to Energy

With regard to energy and national defense, the declaration of policy that accompanies the DPA states that "in order to ensure national defense preparedness, it is necessary and appropriate to assure the availability of domestic energy supplies for national defense needs," and "to further assure the adequate maintenance of the domestic industrial base, to the maximum extent possible, domestic energy supplies should be augmented through reliance on renewable energy sources (including solar, geothermal, wind, and biomass sources), more efficient energy storage and distribution technologies, and energy conservation measures."[33]

In Executive Order 13603 on "National Defense Resources Preparedness,"[34] which delegates DPA authorities, the general term "energy" is defined for the purposes of DPA authorities as "all forms of energy including petroleum, gas (both natural and manufactured), electricity, solid fuels (including all forms of coal, coke, coal chemicals, coal liquefaction, and coal gasification), solar, wind, other types of renewable energy, atomic energy, and the production, conservation, use, control, and distribution (including pipelines) of all of these forms of energy."[35]

In other words, under the DPA's declaration of policy, Congress has found that it is in the interest of national defense preparedness that the government assures that some level of capacity exists in the domestic industrial base to produce and provide both traditional and renewable energy sources, including from biomass sources.

Authorities Under Title III (Expansion of Productive Capacity and Supply)

Authorities in Title III of the DPA deal with the expansion of national defense productive capacity and supply.[36] The various sections authorize the President to provide or guarantee loans to

[30] 50 U.S.C. Appx. §2062; Section 2 of the DPA. This section includes congressional findings, Section 2(a), and a statement of policy of the United States, Section 2(b).

[31] Most notably, Congress allowed Titles II, IV, V, and VI of the DPA to expire in 1953 with the passage and enactment of P.L. 85-95.

[32] See 123 Stat. 2006, 50 U.S.C. Appx. §2166.

[33] See 50 U.S.C. Appx. §2062(a)(5) and §2062(a)(6).

[34] Exec. Order No. 13603, 77 Fed. Reg. 16651 (March 22, 2012).

[35] Section 801(b) of E.O. 13603.

[36] 50 U.S.C. Appx. §§2091-2094; Title III of the DPA.

industry in order to expedite deliveries or expand discovery and production of essential materials, develop technological processes, purchase industrial items or technologies for installation in government or private industrial facilities, make purchases of materials for government use or resale, and provide for the increased use of emerging technologies.

Using Title III authorities, the President may also provide appropriate incentives to develop, maintain, modernize, restore, and expand the productive capacities of domestic sources for critical components, critical technology items, materials and industrial resources essential for the execution of the national security strategy of the United States. Further, the DPA authorizes the President to take appropriate actions to assure that critical components, critical technology items, essential materials, and industrial resources are available from reliable sources when needed to meet defense requirements during peacetime, graduated mobilization, and national emergency.[37]

The DPA statute designates "energy" as one such "strategic and critical" material.[38] However, prior to the DPA being amended and reauthorized in the Defense Production Act Reauthorization of 2009 (Reauthorization of 2009),[39] this designation contained a restriction that the DPA did *not* grant any new direct or indirect authority to the President to "engage in the production of energy in any manner whatsoever (such as oil and gas exploration and development, or any energy facility construction), except as expressly provided in Sections 305 and 306 [50 U.S.C. Appx. §2095 and 2096] for synthetic fuel production." This restriction to the use of DPA authority for energy was removed in Section 5 of the Reauthorization of 2009.[40]

In addition, the Reauthorization Act of 2009 removed the sections of the DPA relating specifically to the production of synthetic fuels (formerly Sections 305, 306, 307, and 308 of the DPA; 50 U.S.C. Appx. §2095 to §2098). Congress no longer considered these provisions necessary, as they served to exempt the synthetic fuels from the restriction on how the DPA could be used for energy production.

Appropriations for Title III of the DPA

Funding for all provisions and purposes of the DPA are authorized in statute.[41] Title III of the DPA also creates a Treasury account named the Defense Production Act Fund (the Fund) that is used to carry out all of the provisions and purposes of Title III. The money in the Fund is available for obligation until expended. The Fund is also used to collect all appropriated funds and proceeds from DPA activities under Title III.[42] However, at the end of any fiscal year, the balance in the Fund cannot exceed $750 million, excluding moneys appropriated that fiscal year or obligated amounts.[43] **Table 1** provides the appropriations to the DPA Fund since FY2010.

[37] 50 U.S.C. Appx. §2077; Section 107(a) of the DPA.

[38] 50 U.S.C. Appx. §2076; Section 106 of the DPA.

[39] P.L. 111-67.

[40] 123 Stat. 2009.

[41] 50 U.S.C. Appx. §2161; Section 711 of the DPA.

[42] See Section 304 of the DPA, 50 U.S.C. Appx. §2094. Examples of proceeds generated from Title III activities could include interest payments on government loans to private business enterprises or the resale of goods purchased under Title III.

[43] Section 304(e) of the DPA, 50 U.S.C. Appx. §2094(e).

Table 1. Appropriations to the DPA Fund Since FY2010, in Millions

Fiscal Year	Law	Appropriation Amount
2010	P.L. 111-118, 123 Stat. 3422	$150.7
2011	P.L. 112-10, 125 Stat. 51	$34.3
2012	P.L. 112-74, 125 Stat. 800	$170.0

Source: CRS analysis of appropriations. Dollars rounded to the nearest hundred thousand.

Use of Title III Authorities of the DPA for Energy

According to the Defense Production Act Committee, an interagency body created in the Reauthorization of 2009 to coordinate the use of the DPA,[44] the federal government has not used the loan guarantee authority provided in Section 301 of Title III[45] in more than 30 years.[46] Current projects are initiated under Section 303 of Title III.[47] Section 303 grants the President an array of authorities to create, maintain, protect, expand, or restore domestic industrial base capabilities essential to the national defense. These authorities include, but are not limited to purchasing or making purchase commitments of industrial resources;[48] encouraging the exploration, development, and mining of critical and strategic materials;[49] and installing and purchasing equipment for industrial facilities to expand their productive capacity.[50] Because "energy" is designated as a "critical material," Section 303 of Title III may therefore authorize the President to make provision for the development of different types of energy that are essential for the national defense.

As with most other authorities the DPA grants to the President, Section 303 of E.O. 13603 delegates authority to the "head of each agency engaged in procurement for national defense."[51] The Secretary of Energy is one such "head of an agency," as defined specifically by E.O. 13603.[52] Though multiple agencies are delegated Title III authorities, DOD was the only agency with an active Title III program as of August of 2011. However, other Departments, including Energy and Homeland Security, have worked with DOD on projects of mutual interest in the past.[53] There are two current Title III projects funded through the DPA Fund and DOD that directly relate to

[44] See 123 Stat. 2019 to 2020 for the creation of the DPAC in statute. The DPAC is now authorized in Section 722 of the DPA, 50 U.S.C. Appx. §2171.

[45] 50 U.S.C. Appx. §2091.

[46] See the sub-heading "Credit Assistance" at http://www.dpacommittee.com/dpa.htm#titleIII.

[47] 50 U.S.C. Appx. §2093.

[48] Section 303(a)(1)(A) of the DPA; 50 U.S.C. Appx. §2093.

[49] Section 303(a)(1)(B) of the DPA.

[50] Section 303(e).

[51] See Section 303 of E.O. 13603.

[52] See the definition of "head of each agency engage in procurement for national defense" in Section 801(h) of E.O. 13603. The Secretary of Energy is identified in Section 201 of the E.O., and therefore is one of the defined heads of an agency.

[53] Department of Homeland Security, *The Defense Production Act Committee: Report to Congress*, Washington, D.C., August 2011, p. 10.

energy.[54] They are a "Lithium Ion Space Battery Production Initiative" and a "Thermal Battery Production" initiative.[55]

Biofuels Memorandum of Understanding

On March 30, 2011, President Obama directed the Secretaries of Agriculture, Energy and the Navy to "investigate how they can work together to speed the development of "drop-in" biofuels substitutes for diesel and jet fuel" as one part of a broader plan to develop and secure the United States' energy resources.[56] Three months after the challenge was issued, the Department of the Navy (Navy), the Department of Energy (DOE), and the Department of Agriculture (USDA) issued a Memorandum of Understanding (MOU) to, in part, "assist the development and support of a sustainable commercial biofuels industry."[57] All three federal agencies have entered into similar MOUs before, with each other and/or with other nations, to spur the development of biofuels.[58]

This MOU is unique in that it focuses solely on commercial-scale development of advanced biofuels and brings in the primary federal agencies involved in the advanced biofuel pathway. An advanced biofuel is essentially any type of biofuel that is non-corn starch ethanol (e.g., algae-based biofuel, biomass-based diesel, cellulosic ethanol).[59] There are three principal federal agencies involved with advanced biofuel research, development, and production.[60] Typically, Congress views USDA as the federal agency that provides resources and support for biofuel feedstock development and feedstock supply (e.g., Biomass Crop Assistance Program). Typically,

[54] For a current list of all DPA Title III projects, see Reauthorization of 2009.

[55] See http://www.dpatitle3.com/dpa_db/project.php?id=67 and http://www.dpatitle3.com/dpa_db/project.php?id=83, respectively.

[56] U.S. President (Obama), "Blueprint for a Secure Energy Future," March 30, 2011, p. 23.

[57] *Memorandum of Understanding Between the Department of the Navy, the Department of Energy, and the Department of Agriculture*, June 2011, http://www.rurdev.usda.gov/SupportDocuments/DPASignedMOUEnergyNavyUSDA.pdf.

[58] There have been at least three biofuel MOUs over the last five years involving the USDA, DOE, or the Navy:

- *Memorandum of Understanding Between U.S. Department of Energy and U.S. Department of Defense*, July 22, 2010, http://energy.gov/sites/prod/files/edg/media/Enhance-Energy-Security-MOU.pdf.
- U.S. Department of Agriculture, "USDA, Navy Sign Agreement to Encourage the Development and Use of Renewable Energy," press release, January 21, 2010, http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=2010/01/0029.xml.
- U.S. Department of Agriculture, "U.S. and China Increase Biofuels Cooperation Ahead of the Third U.S. - China Strategic Economic Dialogue," press release, December 12, 2007, http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=2007/12/0370.xml.

[59] Under the Renewable Fuel Standard (RFS), as amended by the Energy Independence and Security Act Policy Act of 2007, gasoline and diesel fuel must contain a minimum amount of fuel produced from renewable biomass, advanced biofuels are biofuels produced from non-corn feedstocks that must reduce lifecycle greenhouse gas emissions by 50% relative to conventional fuel to qualify. For more information, see CRS Reports CRS Report R40155, *Renewable Fuel Standard (RFS): Overview and Issues*, by Randy Schnepf and Brent D. Yacobucci. For more information on algae-based biofuels, see CRS Report R42122, *Algae's Potential as a Transportation Biofuel*, by Kelsi Bracmort. For more information on cellulosic biofuel, see CRS Report R41106, *Meeting the Renewable Fuel Standard (RFS) Mandate for Cellulosic Biofuels: Questions and Answers*, by Kelsi Bracmort.

[60] Other federal agencies that sit on the periphery of advanced biofuel production are the Environmental Protection Agency (EPA) and the Energy Information Administration (EIA). These two agencies are more concerned with the volume produced, if any, for RFS compliance.

DOE is viewed as the federal agency that provides resources and support for biofuel conversion technologies (e.g., loan guarantees). For this MOU, the Navy is the customer for the advanced biofuel.

The objective of the MOU is the construction or retrofit of multiple domestic commercial or pre-commercial scale advanced drop-in biofuel plants and refineries. The refineries should have the capability to produce ready drop-in replacement advanced biofuels that meet military specifications at a price competitive with petroleum, be at geographically diverse locations with ready market access, and have no significant impact on the supply of agricultural commodities for the production of food. USDA, DOE, and the Navy are expected to fund this initiative at an aggregate of $510 million over three years, with that aggregate amount divided equally among them (**Table 2**). The MOU notes that the timelines and means of contributing to the initiative are subject to change.

Table 2. MOU Funding Commitment

$ Million

	DPA	CCC	Total
DOE	$170	—	$170
USDA	—	$170	$170
Navy	$170	—	$170
Total	$340	$170	$510

Source: MOU.

Notes:

a. DPA – Defense Production Act; CCC – Commodity Credit Corporation Act.

b. The MOU acknowledges that the funding contributions are subject to the availability of funds and subject to each Department's right to terminate the MOU.

c. Funds are to be transferred in accordance with the Defense Production Act (DPA), (50 U.S.C. App. 2061 et seq.), the Commodity Credit Corporation (CCC) Charter Act (15 U.S.C 714 et seq.), the Economy Act (31 USC 1535); and/or other appropriate authority.

MOU Status Update

Within the first three months of the agreement, USDA, DOE, and the Navy issued a formal announcement of their intent to collaborate with the private sector to help produce drop-in advanced biofuels for military and commercial applications.[61] In a separate parallel action, the Navy and USDA announced soon after the MOU announcement that DLA-E would purchase 450,000 gallons of advanced drop-in biofuel from a blend of non-food waste and algae. According to USDA, this is the single largest purchase of biofuel in government history.[62]

[61] U.S. Department of Agriculture, "USDA, Departments of Energy and Navy Seek Input from Industry to Advance Biofuels for Military and Commercial Transportation," press release, August 30, 2011, http://www.usda.gov/wps/portal/usda/usdahome?contentid=2011/08/0385.xml&contentidonly=true.

[62] U.S. Department of Agriculture, "Navy Secretary Ray Mabus and USDA Secretary Tom Vilsack Announce Largest Ever Government Purchase of Biofuel," press release, December 5, 2011, http://usda.gov/wps/portal/usda/usdamediafb?contentid=2011/12/0500.xml&printable=true&contentidonly=true.

Additionally, there are plans to direct federal dollars to the development of a pilot or commercial-scale facility that will produce military-grade drop-in biofuels.[63] The Navy intends to use the drop-in advanced fuel in a demonstration of a Green Strike Group in 2012 during the Rim of the Pacific Exercise.

USDA committed to $170 million in the MOU, and requested $171 million in the FY2013 President's budget request.[64] The funding is being requested under the CCC Charter Act authority granted to USDA to subsidize the production of bio-based jet fuel.[65] USDA reports that there is no existing viable commercial source for the large-scale production of such fuel, and as such, the CCC has entered into an agreement with DOE and the Navy to assist in the development of this product. The current farm bill debate could influence the amount of support USDA gives to the MOU. The 2008 farm bill (Food, Conservation, and Energy Act of 2008, P.L. 110-246) contains an energy title with roughly a dozen bioenergy programs, all of which expire at the end of FY2012.[66] Because of extreme budget uncertainty, it is difficult to anticipate what the funding levels for these programs within this title will be. Any uncertainty about federal funding could also be a disincentive for the private sector to support the advanced biofuels industry. The current economic climate could preclude significant funding for both energy title programs and USDA funding for the MOU.

FY2013 President's Budget Request

In the FY2013 President's budget request, DOE stated it will support this agreement by taking the technical expertise developed in FY2012 and moving to pilot-scale demonstration projects in FY2013. Up to $40 million may be spent on the pilot-scale demonstration projects to support DOE's ongoing technology maturation program and eventually lead to larger-scale production to support the Navy.[67] The pilot-scale demonstration projects could be chosen from potential joint solicitations for defense biofuels production. In its FY2013 request, DOE seeks conditional legislative language that would allow up to $100 million in new appropriations for the Office of Energy Efficiency and Renewable Energy (EERE) to be transferred to the Defense Production Act Fund for pilot demonstrations of drop-in jet biofuels.

The Navy requested $70 million in the FY2013 President's budget request.[68] The funding would be used to "to execute a DPA Title III project, building upon previous efforts and investments by

[63] The White House, *The Blueprint for A Secure Energy Future: Progress Report*, March 2012, http://www.whitehouse.gov/sites/default/files/email-files/the_blueprint_for_a_secure_energy_future_oneyear_progress_report.pdf.

[64] U.S. Department of Agriculture, *USDA FY2013 Budget Summary and Annual Performance Plan*, February 2012, http://www.obpa.usda.gov/budsum/FY13budsum.pdf.

[65] The CCC provides funding for commodity programs administered by the Farm Service Agency and many Farm Bill programs such as the conservation programs administered by FSA and the Natural Resources Conservation Service (NRCS) and export programs administered by the Foreign Agricultural Service (FAS). CCC borrows funds needed to finance these programs from the U.S. Treasury and repays the borrowings, with interest, from receipts and from appropriations provided by Congress.

[66] For more information, see CRS Report R41985, *Renewable Energy Programs and the Farm Bill: Status and Issues*, by Randy Schnepf.

[67] U.S. Department of Energy, *FY2013 Congressional Budget Request Volume 3*, DOE/CF-0073, February 2012, http://www.cfo.doe.gov/budget/13budget/Content/Volume3.pdf.

[68] U.S. Department of Defense, *FY2013 President's Budget Submission*, February 2012, http://comptroller.defense.gov/defbudget/fy2013/budget_justification/pdfs/02_Procurement/Office_of_Defense_Production_Act_PB_2013.pdf.

the Navy and other agencies, with the principal objective being a government-industry partnership for the construction or retrofit of multiple domestic commercial or pre-commercial scale advanced drop-in biofuel plants and refineries." The Navy has collaborated on a regular basis with DOE and USDA.

Defense Production Act Title III Advanced Drop-In BioFuels Production Project

In March 2012, the Air Force issued a Special Notice as defined in the Federal Acquisition regulation (FAR) 5.205 (c) to notify industry that the Defense Production Act (DPA) Title III Program anticipates possible issuance of a Broad Agency Announcement which would request proposals from domestic sources to execute an Advanced Drop-In Biofuel Production Project.[69] The DPA Title III Program would be managed within the Office of the Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy (MIBP) and executed by the Air Force Executive Agent Program Office, a component of the Manufacturing Technology Division (AFRL/RXM) of the Materials and Manufacturing Directorate, Air Force Research Laboratory. As the DOD Executive Agent for the DPA Title III Program, the Air Force is responsible for executing projects that ensure domestic production capability for technology items that are essential to national defense.

The stated goal of the project is establishing one or more complete value chains capable of producing the biofuels. This includes feedstock production, conversion and processing, blending, transportation, and logistics, as well as the design, retrofit, construction, operation, validation, and qualification of domestic, commercial-scale, integrated biorefineries. In the preliminary description provided by the Special Notice, the project would require domestically produced biofuel, compliance with Section 526 of the Energy Independence and Security Act of 2007 (P.L. 110-140), an acceptable feedstock source, suitability for military operational use, a biorefinery with a rated capacity of at least 10 million gallons of neat biofuel per year, and a commitment of at least 50% cost sharing. The project would take a phased approach, with Phase 1 representing completion of planning and preliminary design, with contracts to be tentatively awarded in early 2013. Phase 2 represents facility construction, commissioning, and performance testing as well as delivery of the biofuels, and assumes that awardees would be under contract in early 2014.

FY2013 Authorizations and Appropriations

As of the this report's date, both the Committees on Energy and Water Development, and the Armed Forces have introduced report language regarding the Navy's biofuel initiative. The House Energy and Water Development Committee does not recommend funding, while both Senate Committees for Energy and Water Development and Armed Forces support the initiative.

[69] U.S. Air Force, *Defense Production Act Title III Advanced Drop-In Bio Fuels Production Project*, May 15, 2012, https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=9ec4273b98ce62c3178916a432967581&_cview=0.

FY2013 Energy and Water Development Appropriations Bill, H.Rept. 112-462 to Accompany H.R. 5325

The House report to accompany H.R. 5325 offers no funding for the proposed initiative, and it does not include the requested legislative language.[70] Specifically, the Committee notes "the Department has not adequately justified why the Department of Energy should fund this Defense initiative, and whether the proposed investments can successfully lower costs to competitive levels in several years or will only serve to sink costs into a product that is too immature to compete without federal support. The recommendation includes no funding for the proposed initiative and does not include the requested legislative language."

FY2013 Energy and Water Development Appropriations Bill, S.Rept. 112-164 to Accompany S. 2465

The Senate report to accompany S. 2465 supports the collaboration between the Navy, Agriculture, and Energy.[71] Specifically, the Committee "recognizes that quality and reliability of supplies will be key in acceptance of advanced drop-in biofuels into the supply chain once they are demonstrated at a convincing scale. To that end, the Committee is supportive of the collaboration between the Navy, Department of Agriculture and DOE to develop innovative technologies for jet and diesel fuels for military uses. With the Department of Defense as an early adopter of these alternative fuels, the wider marketplace will be more likely to follow."

FY2013 National Defense Authorization Act, S.Rept. 112-173 Report to Accompany S. 3254

With regard to the limitation on availability of funds for procurement of alternative fuel (Section 313), the Senate Armed Forces Committee "recommends a provision that would prohibit the use of funds authorized to be appropriated to the Department of Defense in fiscal year 2013 from being obligated or expended for the production or sole purchase of an alternative fuel if the cost exceeds the cost of traditional fossil fuels used for the same purpose, except for continued testing purposes.... The committee strongly supports initiatives undertaken by the Department of Defense to reduce the fuel demand of the operational forces through affordable new technologies that increase fuel efficiency and offer alternative sources of power. But given the pressure placed on current and future defense budgets, the committee is concerned about the use of operation and maintenance funds to pay significantly higher costs for biofuels being used for RDTE[72] efforts. Therefore, the committee directs the Secretary of Defense to develop and promulgate guidance to the military services and defense agencies on the difference between the operational use of alternative fuels versus continued RDTE initiatives." The committee also recommends a provision (Section 2823) that would prohibit the Department of Defense from entering into a contract to plan, design, or construct a biofuel refinery or any other facility or infrastructure used to refine biofuels unless such planning, design, or construction is specifically authorized by law.

[70] H.Rept. 112-462, page 86.

[71] S.Rept. 112-164, page 73.

[72] Research, Development, Testing, and Evaluation.

FY3101 National Defense Authorization Act, H. Rept. 112-479 Report to Accompany H.R. 4310

Section 314—Limitation on Availability of Funds for Procurement of Alternative Fuel would prohibit the use of funds for the production or purchase of any alternative fuel if the cost of producing or purchasing the alternative fuel exceeds the cost of producing or purchasing a traditional fossil fuel. This section would also provide an exception for the Secretary of Defense to purchase limited quantities of alternative fuels to complete fleet certification of 50/50 alternative fuel blends.

Policy Considerations

Industrial Viability of Advanced Biofuel

Advanced biofuels have been promoted for the past several years as promising potential players in the renewable fuels market. However, there is presently no operating domestic commercial-scale production facility for an advanced biofuel, although some are under construction.[73] Proponents argue that advanced biofuels are the preferred renewable fuel alternative because advanced biofuel feedstocks might not compete with traditional food crops used for food and feed. However, there may still be competition for resources to cultivate the feedstock (e.g., land and water). Proponents of advanced biofuels argue that it will add to the United States' energy security. However, others assert that economic and technical barriers will prevent advanced biofuels from entering mainstream consumption for some time to come. Furthermore, the use of agricultural land for advanced biofuel production was a key sticking point as EPA considered public comment about this aspect of advanced biofuels production eligibility for the Renewable Fuels Standard.[74] Others question whether the federal government should be involved in advanced biofuel production at all.

Some proponents who support advanced biofuels generally question the form that federal involvement should take. For example, some question whether the Navy, using Defense funding, should be the testing ground for advanced biofuels—particularly aviation biofuels—that at present cost significantly more than conventional fuels.[75] Some analysts and government officials counter that argument by reporting that DOD is the single largest consumer of oil in the United States and therefore represents a relatively significant share of total national petroleum use, and that DOD relies "far too much on sometimes politically unstable foreign sources of fossil fuels."[76]

The advanced biofuel industry appears to be most focused on demonstrating that the technology exists to produce advanced biofuels at commercial scale. Another important consideration for the advanced biofuel industry at this moment is the planning and development of other production

[73] For instance, POET LLC's Project Liberty plant (http://www.projectliberty.com/).

[74] For more information, see CRS Report R40460, *Calculation of Lifecycle Greenhouse Gas Emissions for the Renewable Fuel Standard (RFS)*, by Brent D. Yacobucci and Kelsi Bracmort.

[75] Fred Lucas, "Navy Biofuel Deal is 'Cost Prohibitive,' 'Another Solyndra,' Critics Say," CNSNews.com, December 23, 2011.

[76] U.S. Navy, Department of Navy Biofuel Initiatives, Biofuels and the U.S. Military webinar, April 4, 2012, http://www.acore.org/wp-content/uploads/2012/03/Chris-Tindal-Presentation.pdf.

factors (e.g., feedstock supply, infrastructure) which will play a role in a stable advanced biofuel market—the ultimate goal for the industry.

Biofuel as a National Defense Need

Generally, military/operational fuel supply problems present logistical challenges that may fall under the process of peacetime planning or "deliberate planning"—the process of preparing contingency plans for military action.[77] A domestic biofuel industry, fostered through DPA authorities, would appear to address the contingency of a long-term petroleum supply disruption, assuming that North American production and resources have declined precipitously and shifted reliance to imported crude oil. At present, the United States imports 49% of its petroleum, which includes crude oil (roughly 40%) and refined products.[78] Canada provides the United States with 25% of its imports, and could likely increase the amount depending upon the approval of the Keystone XL pipeline.[79]

However, in the case of short-term disruptions, the United States maintains the Strategic Petroleum Reserve as part of an obligation to the International Energy Agency (IEA) agreement.[80] The SPR's utility in meeting Department of Defense (DOD) needs is limited by volume of jet or diesel fuel a refinery can produce from a barrel of oil. On average, Gulf Coast refineries yield only 6% to 8% kerosene-jet fuel per barrel of oil.[81] That is, a 42-gallon barrel of oil yields at most 3 to 4 gallons of jet fuel when refined. Were it not for motorists, truckers, and airlines purchasing most of the remaining products refined from a barrel of crude oil, the cost of refining jet fuel exclusively for military use would be considerably higher. (This would assume little or no value in upgrading the leftover portion of the barrel). That is, consumers, not taxpayers, effectively subsidize the military jet fuel production.

The policy question writ large is whether a biofuel industry is necessary for national defense. If the answer is yes, then the Defense Production Act may be the appropriate authority for the Navy to proceed with its MOU. Proponents of a domestic biofuel industry view it as necessary in guaranteeing a fuel supply for the needs of the Navy, presuming that the future availability of both domestic and international petroleum resources are may be uncertain. Projections of North American fossil energy supply would call the proponent's argument into question. Just a few years ago, fears of "Peak Oil" production drove policy discussions on U.S. energy security. However, domestic crude oil production has increased over the past few years, reversing a decline that began in 1986. The United States is now a net exporter of refined petroleum products. The U.S. Energy Information Administration (EIA) reports that U.S. crude oil production increased

[77] Contingency planning for military action begins with the President's national strategy statement backed with the necessary funding support provided by Congress. See Joint Forces Staff College, *The Joint Staff Officer's Guide 2000*, JFSC Pub 1, 2000, Chapter 4-Deliberate Planning, http://www.au.af.mil/au/awc/awcgate/pub1/index2000.htm.

[78] U.S. Energy Information Administration, *How Dependent Are We on Foreign Oil?*, http://www.eia.gov/energy_in_brief/foreign_oil_dependence.cfm.

[79] CRS Report R41668, *Keystone XL Pipeline Project: Key Issues*, by Paul W. Parfomak et al., and CRS Report R42124, *Proposed Keystone XL Pipeline: Legal Issues*, by Adam Vann et al.

[80] See CRS Report R42460, *The Strategic Petroleum Reserve: Authorization, Operation, and Drawdown Policy*, by Anthony Andrews and Robert Pirog.

[81] See CRS Report R41478, *The U.S. Oil Refining Industry: Background in Changing Markets and Fuel Policies*, by Anthony Andrews, Robert Pirog, and Molly F. Sherlock, *The U.S. Oil Refining Industry: Background in Changing Markets and Fuel Policies*, by Anthony Andrews, Robert Pirog, and Molly F. Sherlock.

from 5.1 million barrels per day in 2007 to 5.5 million barrels per day in 2010.[82] Over the next 10 years, EIA sees continued development of tight oil, in combination with the ongoing development of offshore resources in the Gulf of Mexico, pushing domestic crude oil production in the EIA Reference Case to 6.7 million barrels per day by 2020, a level not seen since 1994. Even with a projected decline after 2020, EIA projects that U.S. crude oil production will remain above 6.1 million barrels per day through 2035. U.S. refineries consumed just over 5.4 billion barrels of crude oil in 2011, or approximately 14.8 million barrels per day.[83]

Biofuel proponents would also argue that spending U.S. dollars on imported crude oil supports foreign adversaries or props up corrupt regimes. However, out of all the major oil exporting nations, currently the U.S. State Department lists only Iran as a terrorist country, and the United Nations Security Council trade sanctions in place (UNSC Resolution 1929) significantly restricts Iran's oil exports.[84]

No matter whether fuels are domestically or foreign sourced, certain logistical challenges arise with delivering or acquiring fuel in overseas operational areas. For example, during U.S. operations in Afghanistan, insurgent forces frequently attacked over-the-road fuel convoys and that caused numerous U.S. and contractor casualties as well as equipment and fuel losses. Despite the fuel convoys' vulnerability, DLA-E generally found fuel sources to be available; though the sources' alliances and loyalties may have been questionable, the transactions may have gained some regional cooperation. Refueling in foreign ports also introduces certain vulnerabilities, as tragically illustrated by the al-Qaeda attack on USS *Cole* at Aden, Yemen, in October of 2000; the unforeseen consequence of State Department efforts to cultivate U.S.-Yemeni ties. Relying solely on at-sea refueling for fleet units worldwide would also introduce challenges requiring a substantial increase in the number of Military Sealift Command oilers in service. For routine operations, the Navy can expect to keep only about one third of its 14-oiler force at sea at any given moment. The four or five oilers routinely deployed cannot indefinitely sustain a seagoing fleet of three to four carrier battle groups and three to four amphibious readiness groups deployed worldwide, plus a number of naval units steaming independently. Therefore, decisions on whether to refuel Navy ships at sea or in foreign ports depends on both the tactical calculus of committing scarce fleet oilers and the political calculus of "showing the flag" by sending fleet units into port. To some extent, then, this offers an opportunity for the exercise of relatively inexpensive diplomatic "soft power" by the United States in the form of contracts with local companies for the supply of marine fuel.

DOD might argue that it faces financial, operational, as well as strategic risks from its reliance on petroleum-based fuels, as detailed in the CRS Report R42558, *Department of Defense Energy Initiatives: Background and Issues for Congress*, by Moshe Schwartz, Katherine Blakeley, and Ronald O'Rourke. The financial risks include rising fuel costs over the long term, and increasing price volatility in the short term. Operational risks include the diversion of resources to the task of moving fuel to the battlefield, fuel requirements restraining the mobility U.S. forces and the combat effectiveness of U.S. equipment, and the vulnerability of fuel supply lines to disruption.

[82] U.S. Energy Information Administration, *Annual Energy Outlook 2012 Early Release Overview*, January 23, 2012, p. Executive Summary, http://www.eia.gov/forecasts/aeo/er/executive_summary.cfm.

[83] U.S. Energy Information Administration, "U.S. Refinery and Blender Net Input of Crude Oil" in *U.S. Crude Oil Supply and Disposition*, http://www.eia.gov/dnav/pet/pet_sum_crdsnd_k_a.htm.

[84] U.S. Department of State, Directorate of Defense Trade Controls, *Country Policies and Embargoes*, http://pmddtc.state.gov/embargoed_countries/index.html.

Strategic challenges include getting fuel to the area of operations, and DOD's role in ensuring the global free flow of oil. The Navy might argue that investing in a domestic biofuels industry would insulate the Navy from the effects of volatile crude oil prices, decrease its reliance on foreign oil exports from politically unstable or hostile regimes, as well as enhance U.S. energy independence and energy security by creating a reliable energy source. In testimony before the Senate Subcommittee on Readiness and Management Support, the Vice Chief of Naval Operations underscored the pressure on readiness accounts from increased fuel prices, adding that "every $1 increase in the price per barrel of fuel results in approximately $31M of additional cost annually above our budgeted level."[85]

The Navy has a lower dependence on petroleum than other services because its aircraft carriers and submarines are nuclear-powered. In FY2010, the Navy met 59% of its overall energy needs from petroleum, 22% from nuclear-powered ships, and 19% from electricity (for shore operations). The Navy nuclear reactor program, an outcome of the Defense Production Act, not only validated nuclear power, but also paved the way for commercial nuclear power and provided the first trained reactor operators. With the exception of the Navy's nuclear power program, policies designed to replace petroleum-based fuels with fuels derived from alternative resources in the past have given way when newly discovered petroleum resources presented clear economic advantages. That risk remains even if the Biofuel MOU is funded.

Whatever advantages biofuels may convey, the Navy is not without recourse in acquiring them directly by the customary acquisition process, as limited quantity procurements have already demonstrated. At $26 per gallon, the $510 million the Navy seeks to fund the MOU would purchase 467 thousand barrels of HRJ-5. Assuming that private interests successfully developed biofuel plants under DPA funding, they would still have to submit competitive bids on future fuel contracts under current procurement rules.

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[85] U.S. Congress, Senate Committee on Armed Services, *National Defense Authorization Act for Fiscal Year 2013*, Report to Accompany S. 3254, 112th Cong., 2nd sess., June 4, 2012, 112-173, pp. 80-81.